

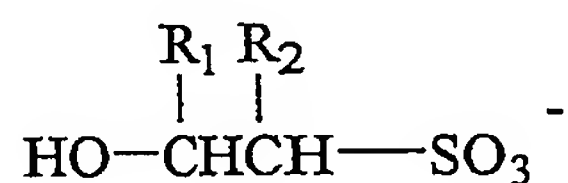
What is claimed is:

1. A process useful for forming an aqueous composition of matter comprising a mixture of alkyl-substituted hydroxyethane sulfonates comprising the steps of:

- 5 a) providing at least one alkylene oxide having between 3 and 8 carbon atoms per molecule;
- b) providing an aqueous solution comprising bi-sulfite anions;
- c) contacting the aqueous solution with the alkylene oxide while maintaining the pH at a range between about 6.0 and about 10.0,

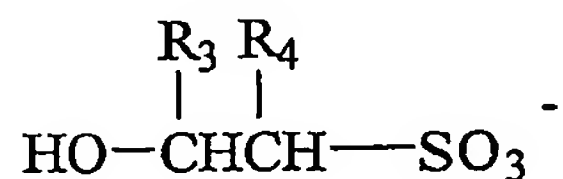
wherein the mixture of alkyl-substituted hydroxyethane sulfonates comprises:

- 10 (i) a first anion having the structure:



wherein one of R_1 and R_2 is a straight chain or branched C_1 to C_6 alkyl group and the remaining R_1 and R_2 is hydrogen; and

- (ii) a second anion having the structure:



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wherein one of R_3 and R_4 is a straight chain or branched C_1 to C_6 alkyl group and the remaining R_3 and R_4 is hydrogen.

2. The process according to claim 1 wherein the aqueous solution of bi-sulfite ions further includes at least one ion selected from the group consisting of: sodium, potassium, lithium, magnesium, calcium and ammonium ions.

5 3. The process according to claim 1 wherein the contacting is conducted at a temperature range of between about 20° C to about 200° C.

4. The process according to claim 1 wherein the contacting is conducted at a pressure range of between about 0.5 atmospheres and about 7 atmospheres.

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5. A process useful for forming an aqueous composition of matter comprising a mixture of alkyl-substituted hydroxyethane sulfonates comprising the steps of:

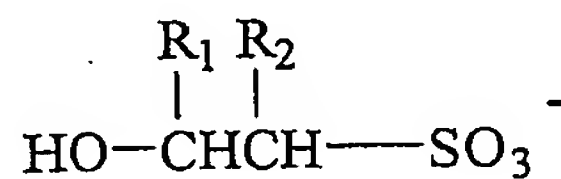
a) providing at least one alkylene oxide having between 3 and 8 carbon atoms per molecule;

15 b) providing an aqueous solution comprising bi-sulfite anions wherein the bi-sulfite anions are produced by reacting sulfur dioxide with an hydroxide solution;

c) contacting the aqueous solution with the alkylene oxide, while maintaining the pH at a range between about 7.0 and about 8.0,

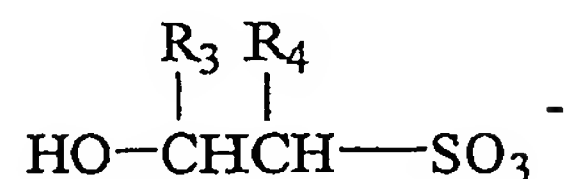
wherein the mixture of alkyl-substituted hydroxyethane sulfonates comprises:

20 (i) a first anion having the structure:



wherein one of R_1 and R_2 is a straight chain or branched C_1 to C_6 alkyl group and the remaining R_1 and R_2 is hydrogen; and

(ii) a second anion having the structure:



5 wherein one of R_3 and R_4 is a straight chain or branched C_1 to C_6 alkyl group and the remaining R_3 and R_4 is hydrogen.

6. The process according to claim 5 wherein the hydroxide solution is a 50% by weight sodium hydroxide solution.

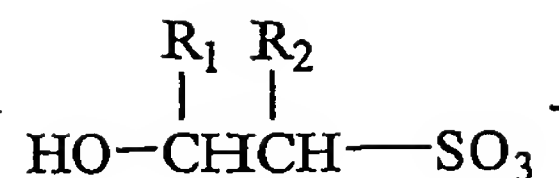
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7. A process useful for forming an aqueous composition of matter comprising a mixture of alkyl-substituted hydroxyethane sulfonates comprising the steps of:

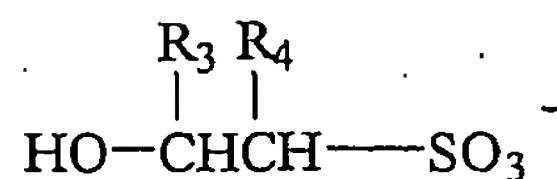
- a) providing an alkylene oxide selected from the group consisting of: propylene oxide and butylene oxide, and mixtures thereof;
- 15 b) providing an aqueous solution of bi-sulfite anions;
- c) contacting the aqueous solution with the alkylene oxide, while maintaining the pH at a range of between about 6.0 and 10.0,

wherein the mixture of alkyl-substituted hydroxyethane sulfonates comprises:

(i) a first anion having the structure:



and (ii) a second anion having the structure:



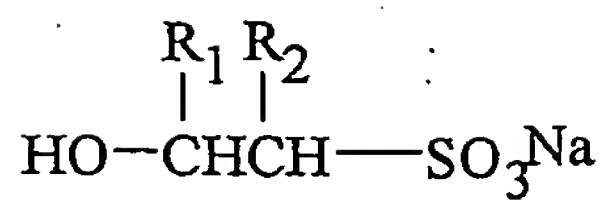
5 wherein R₁ is independently selected from the group consisting of: methyl and ethyl; R₂ is hydrogen; R₃ is hydrogen; and R₄ is independently selected from the group consisting of: methyl and ethyl.

8. A process for forming a powder comprising a mixture of sodium alkyl-substituted
10 hydroxyethane sulfonates comprising the steps of:

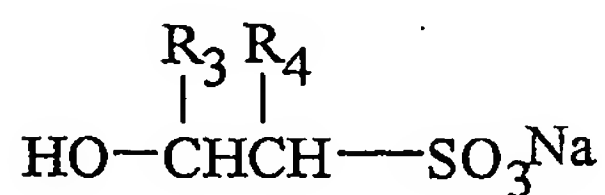
- a) providing an alkylene oxide selected from the group consisting of: propylene oxide and butylene oxide, and mixtures thereof;
- b) providing an aqueous solution of sodium bi-sulfite;
- c) contacting the aqueous solution of sodium bi-sulfite with the alkylene oxide,
15 while maintaining the pH at a range of between about 6.0 and 10.0 for about 1 to about 6 hours to form a product mixture; and
- d) drying the product mixture to the powder,

wherein the mixture of sodium alkyl-substituted hydroxyethane sulfonates comprises:

- (i) a first sodium alkyl-substituted hydroxyethane sulfonate having the structure:

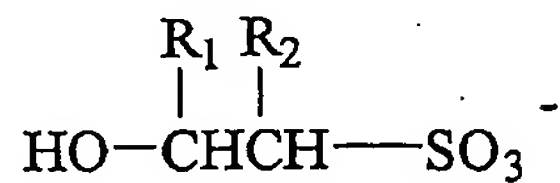


and (ii) a second sodium alkyl-substituted hydroxyethane sulfonate having the
5 structure:



wherein R_1 is independently selected from the group consisting of: methyl and ethyl; R_2 is
10 hydrogen; R_3 is hydrogen; and R_4 is independently selected from the group consisting of:
methyl and ethyl.

9. An aqueous composition of matter which comprises a first anion having the
structure:



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wherein one of R_1 and R_2 is a straight chain or branched C_1 to C_6 alkyl group and the
remaining R_1 and R_2 is hydrogen; and a different second anion having the structure:



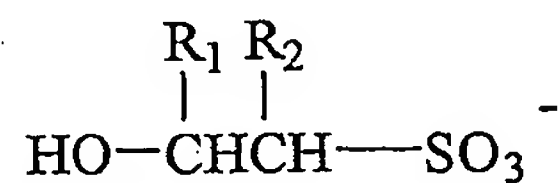
wherein one of R_3 and R_4 is a straight chain or branched C_1 to C_6 alkyl group and the remaining R_3 and R_4 is hydrogen.

10. The composition according to claim 9 wherein the C_1 to C_6 alkyl group on the first
5 anion is the same as the C_1 to C_6 alkyl group on the second anion.

11. The composition according to claim 9 wherein water is present in an amount
between about 20% and about 90 % by weight based on the total weight of the
composition.
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12. An aqueous composition of matter which comprises:

(i) a first anion having the structure:



and (ii) a second anion having the structure:

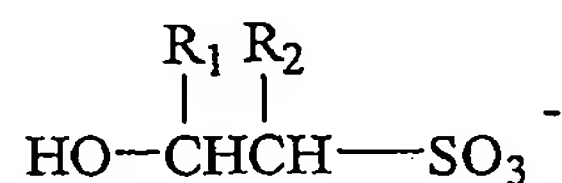


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wherein R_1 is independently selected from the group consisting of: methyl and ethyl; R_2 is hydrogen; R_3 is hydrogen; and R_4 is independently selected from the group consisting of: methyl and ethyl.

13. A process for producing a surfactant material useful as a component of a personal care cleansing composition which comprises:

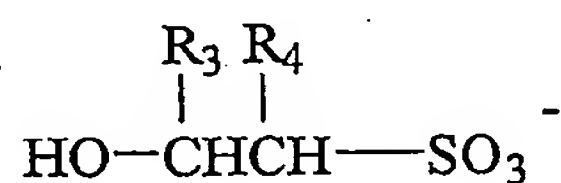
a) providing a mixture of isethionate anions which comprises a first anion having the structure:



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in which R₁ is straight chain or branched C₁ to C₆ alkyl group and R₂ is hydrogen; and

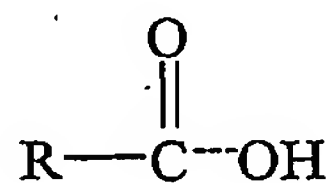
(ii) a second anion having the structure:



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in which R₃ is hydrogen and R₄ is an straight chain or branched C₁ to C₆ alkyl group;

b) contacting the mixture of isethionate anions with one or more carboxylic acids of the formula:



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in which R is any hydrocarbon group having between about 4 and about 25 carbon atoms, including straight-chain, branched, saturated and unsaturated hydrocarbon groups so as to form a reactive mixture; and

c) heating the reactive mixture at any temperature in the range of between 90° C and 240°C to produce an acyl alkylisethionate mixture containing at least two different anions which are isethionate esters of a carboxylic acid.

14. The process according to claim 13 further comprising the step applying a vacuum of about 1 mm to about 200 mm Hg at a temperature of about 100° to about 200°C to reduce the amount of carboxylic acid in the surfactant material to less than 10% by weight.

15. An ester anion mixture having surfactant properties useful in formulating personal care cleansing products comprising:

a) a first ester anion having the structure:



and

b) a second ester anion having the structure:

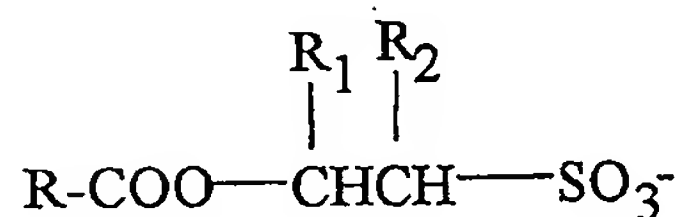


in which R is in each occurrence a hydrocarbon group having between about 4 and about 25 carbon atoms, including straight-chain, branched, saturated and

unsaturated hydrocarbon groups; one of R₁ and R₂ is an alkyl group selected from the group consisting of: C₁ to C₆ alkyl, and the remaining group R₁ or R₂ which is not C₁ to C₆ alkyl is hydrogen; one of R₃ and R₄ is an alkyl group selected from the group consisting of: C₁ to C₆ alkyl, and the remaining group R₃ or R₄ which is not C₁ to C₆ alkyl is hydrogen.

16. An ester anion mixture having surfactant properties useful in formulating cleansing products which comprises:

a) a first ester anion having the structure:



and

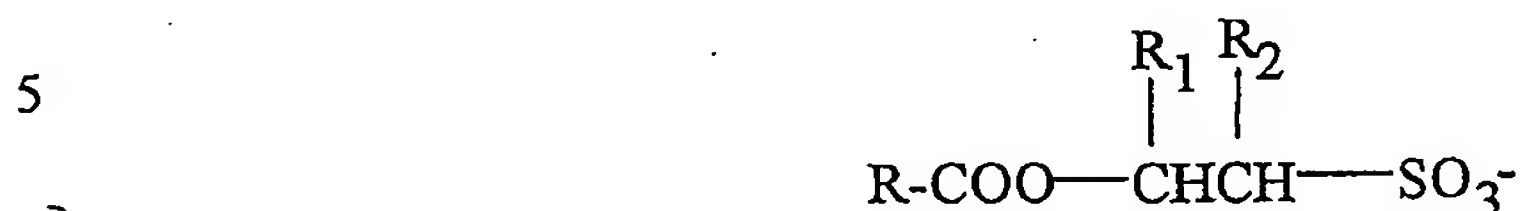
b) a different second ester anion having the structure:



in which R is any hydrocarbon group having between about 4 and about 25 carbon atoms, including straight-chain, branched, saturated and unsaturated hydrocarbon groups; R₁ is independently selected from the group consisting of: methyl and ethyl; R₂ is hydrogen; R₃ is hydrogen; and R₄ is independently selected from the group consisting of: methyl and ethyl.

17. A composition of matter useful as a concentrate from which cleansing products may be prepared comprising:

a) one or more ester anions of an alkylisethionic acid according to the formula:



wherein R is a hydrocarbon group having between about 4 and 25 carbon atoms, including straight-chain, branched, saturated, and unsaturated hydrocarbon groups; R₁ and R₂ may each independently be hydrogen or an alkyl group selected from the group consisting of: C₁ to C₆ alkyl subject to the proviso that both R₁ and R₂ are not simultaneously hydrogen; and

b) at least one member selected from the group consisting of: water, a surfactant and optional ingredient used in preparing the cleansing product.

15 18. A composition of matter from which personal care cleansing products may be prepared which comprises:

a) any amount between 99.50 % and 0.25 % of a first component which comprises one or more ester anions of an alkylisethionic acid according to the formula :



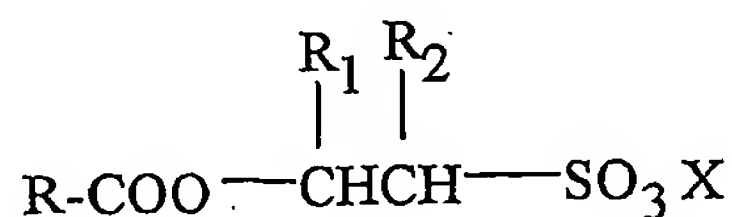
in which R is any hydrocarbon group having between about 4 and about 25 carbon atoms, including straight-chain, branched, saturated, and unsaturated hydrocarbon

groups; R₁ and R₂ may each independently be hydrogen or an alkyl group selected from the group consisting of: C₁ to C₆ alkyl, subject to the proviso that both R₁ and R₂ are not simultaneously hydrogen; and

- b) any amount between 99.75% and 0.50% of a second component comprising one or more members selected from the group consisting of: fatty acids, alkyl sulfates, an ethanolamine, an amine oxide, alkali carbonates, water, ethanol, isopropanol, pine oil, sodium chloride, sodium silicate, polymers, alcohol alkoxylates, zeolites, perborate salts, alkali sulfates, enzymes, hydrotropes, dyes, fragrances, preservatives, brighteners, builders, polyacrylates, essential oils, alkali hydroxides, water-soluble branched alkylbenzene sulfonates, ether sulfates, alkylphenol alkoxylates, fatty acid amides, alpha olefin sulfonates, paraffin sulfonates, betaines, chelating agents, tallowamine ethoxylates, polyetheramine ethoxylates, ethylene oxide/propylene oxide block copolymers, alcohol ethylene oxide/propylene oxide low foam surfactants, methyl ester sulfonates, alkyl polysaccharides, N-methyl glucamides, alkylated sulfonated diphenyl oxide, and polyethylene glycol.

19. A personal care cleanser comprising an acylalkylisethionate ester having the formula

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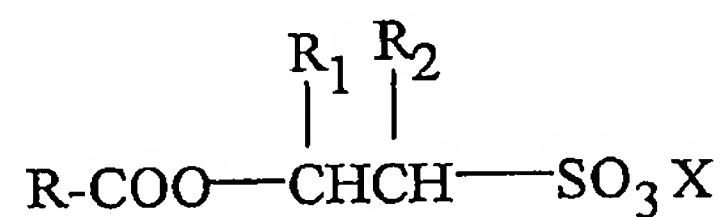


wherein R is a hydrocarbon group having between 4 and 25 carbon atoms; R₁ and R₂ are each independently selected from the group consisting of hydrogen and a branched or straight-chain aliphatic C₁ to C₆ alkyl group subject to the proviso that one of R₁ and R₂ is the branched or straight-chain aliphatic C₁ to C₆ alkyl group while the remaining R₁ or R₂ is hydrogen; and X is selected from the group consisting of hydrogen, an alkali metal, an alkaline earth metal, zinc, aluminum, ammonium and ammonium ions substituted with one or more organic groups.

20. The personal care cleanser of claim 19 further comprising at least one member selected from the group consisting of: amphoteric surfactant; zwitterionic surfactant; anionic surfactant; nonionic surfactant; cationic surfactant; water and optional ingredient.

21. A composition of matter comprising:

(i) an acylalkylisethionate ester having the formula:



wherein R is a hydrocarbon group having between 4 and 25 carbon atoms; R₁ and R₂ are each independently selected from the group consisting of hydrogen and a branched or straight-chain aliphatic C₁ to C₆ alkyl group subject to the proviso that one of R₁ and R₂ is the branched or straight-chain aliphatic C₁ to C₆ alkyl group while the remaining R₁ or R₂

R₂ is hydrogen; and X is selected from the group consisting of hydrogen, an alkali metal, an alkaline earth metal, zinc, aluminum, ammonium and ammonium ions substituted with one or more organic groups; and

(ii) at least one other member selected from the group consisting of: amphoteric surfactant; zwitterionic surfactant; anionic surfactant; nonionic surfactant; cationic surfactant; water and optional ingredient.

22. The composition of matter of claim 21 wherein the acylalkylisethionate ester is present in an amount ranging between about 1% by weight to about 60% by weight.

23. The composition of matter of claim 21 wherein the composition of matter is a shampoo, baby shampoo, baby wipe, children wipe, make-up remover tissue, showergel, foam bath, liquid soap, soap bar, syndet bar, or acne wash.